XIV. *Notes on Seasonal Dimorphism in South African* Rhopalocera. By Guy A. K. Marshall, F.E.S.

[Read May 6th, 1896.]

I am much pleased to observe that the very important and long-neglected subject of Seasonal Dimorphism in African Butterflies is at last receiving the attention of so eminent an authority on entomological matters as Mr. A. G. Butler, and I trust that the short paper before me will soon be supplemented by many of a like nature, for it is high time that the nomenclature of African *Rhopalocera*, and more especially the *Pieridæ*, should be thoroughly revised from the standpoint of seasonal variation. The opinions expressed by my friend, Mr. Cecil W. Barker, in his most interesting paper on this subject (Trans. Ent. Soc. 1895, p. 413) will, I think, be upheld by all South African lepidopterists who have taken the trouble to investigate the matter, though I consider his rule that the dry season form is generally smaller than the wet season one to be inadvisable, for the exceptions to it certainly equal if they do not exceed the illustrations of it. Mr. Butler's remarks on the group of *Teracoli*, represented by *T. vesta*, Reiche, are in every way excellent, but when he proceeds to discuss the seasonal forms of the genus *Acræa* we have an instructive example of the extreme difficulty in accurately defining the specific differences of butterflies merely from a series of museum specimens when not backed up by a practical knowledge of the habits and range of the species involved. Indeed, I have not the slightest hesitation in stating that, in the present instance, the results arrived at are entirely incorrect and misleading. Here is Mr. Butler's provisional revision of the *Acrita* group :—

Dry season form.		Wet season form.
(1.) *Acræa anacreon*, Trim.	=	*Acræa bomba*, H. G. Smith.
(2.) *Acræa guillemei*, Oberth.	=	*Acræa periphanes*, Oberth.
(3.) *Acræa doubledayi*, Guer.	=	*Acræa dircæa*, Westw.
(4.) *Acræa stenobea*, Wallg.	=	*Acræa caldarena*, Hew.
(5.) *Acræa pudorina*, Staud.	=	*Acræa chæribula*, Oberth.

It will be advisable to discuss each of these pairs separately in order to properly test the truth or otherwise of the contention that they are merely seasonal forms of one species.

(1.) *A. anacreon*, Trim. = *A. bomba*, H. G. Smith. *Bomba* is quite unknown to me, and at the present time I am unable to obtain access to the description of the type, but I note that Mr. Butler considers it to be identical with *induna*, Trim., described from specimens captured by myself in Mashunaland. Assuming this provisionally to be the case, I think I can clearly show that *bomba* (= *induna*) is very far from being a seasonal form of *A. anacreon*, Trim. I have taken *induna* fairly commonly in Salisbury (5,000 ft.) during every month in the year, except the three driest and coldest, viz., May, June, and July; it is, however, most abundant during the height of the rains, from the middle of December to the middle of March. In the Gadzima district on the middle Umfuli River (4,200 ft.) it is not very common. On the sources of the Mazoë River (4,000 ft.), about 20 miles north of Salisbury, it was distinctly scarce, and its eastern range seems to extend only to Umtali (3,700 ft.). Throughout the whole of this area where I have been collecting carefully for the last three years, I have never seen or heard of a single specimen of *anacreon*. Moreover it is noteworthy that *induna* itself exhibits seasonal variation. The ♂ and ♀ figured by Trimen (Trans. Ent. Soc. 1895, pl. v., figs. 3, 3a) are wet season forms, though not very strongly marked ones. [N.B. The figure of the ♂ does not properly show the markedly paler tint of the ground-colour of the forewings beyond middle, as compared with the basal portion.]

In the extreme dry season form the ♂ and ♀ are almost identically coloured, the black basal suffusion in the hindwings being much reduced or even obsolete. The black marginal edging of hindwings is also reduced, so that the three yellow spots in it which are nearest the anal angle merge into the ground-colour, and the remainder up to the apical angle are clearly defined.

In the wet season form the ♂ has a strong black basal suffusion in the hindwings, and the hindmargin is better developed, the contained yellow spots being much reduced, and those near apical angles almost always obsolete. The ♀ also exhibits these differences, but the

blackish suffusion in hindwings is usually more developed, and in some specimens almost entirely obliterates the red ground-colour. The forewings are much paler, being in some cases creamy with ochreous basal suffusion.

Anacreon I have met with in Natal, where it occurs commonly all the year round. This species also exhibits a distinct dry season form (variety A of Trimen) in which the wings are more elongate with the black markings attenuated. Apart from the fact that *anacreon* itself occurs abundantly during the wet season, if *induna* is really the wet season form of this very common species, how is it that it has never been met with in Natal, and *anacreon* has never been met with in Mashunaland?

To summarise: We have here two species strikingly different in appearance, and of different habits, one of which is only found within the tropic, while the other only occurs to the south of it, and both of which exhibit seasonal forms independently, yet we are asked to believe that these are merely seasonal forms of one and the same species. If such be the results of the theory that the apical patch in *Acræa* is a seasonal and not a specific difference, the sooner that theory is demolished the better.

(2.) *A. guillimei*, Oberth. = *A. periphanes*, Oberth. I am quite unacquainted with either of these species, and therefore cannot comment upon their association.

(3.) *A. doubledayi*, Guer. = *A. dircæa*, Westw.
A. stenobea, Wallg. = *A. caldarena*, Hew.

This proposed alteration of nomenclature shows a most lamentable confusion as to what are real specific differences in *Acræa*. I entirely agree with Trimen that *A. dircæa*, Westw., is quite inseparable from *A. caldarena*, Hew., being merely a seasonal variation of it, as is also *A. amphimalla*, Westw. As in the case of *anacreon*, a study of the geographical range of the forms under consideration would in itself be sufficient to show the fallacy of Mr. Butler's supposition. *Caldarena* is one of the commonest butterflies in Mashunaland, and occurs abundantly the whole year round, showing a slight seasonal dimorphism. The ♂ varies but little, showing only a slight accentuation of the black markings in summer, the ground-colour being of a richer pink; but in the ♀ this accentuation is often carried to a much

greater extent, the fuscous suffusion in the hindwings almost entirely veiling the ground-colour. The colour of the forewings also shows a strong tendency, as in *A. induna*, to become of a pale creamy tint. Such specimens often exhibit more or less white clouding in the hindwings. *Caldarena* is essentially a tropical species, only just entering the extra-tropical area, whereas *stenobea* is not found in the tropics at all, but occurs as far south as the Eastern districts of the Cape Colony. The only point at which its range overlaps that of *caldarena* appears to be in the region of the Marico and Upper Limpopo Rivers.

I have never met with this insect in life, but from the description I have not the slightest doubt that *A. lygus*, Druce (= *stenobea*, var. A of Trimen) is merely the dry season form of *stenobea*. The absurdity of amalgamating *stenobea* with *caldarena* is therefore manifest. With regard to *doubledayi* there is no question that it is quite distinct from *caldarena* (= *dircæa*), for apart from the fact that they both occur at all seasons, their geographical ranges do not coincide at all—at least so far as my experience goes. *Doubledayi* does not occur in Mashunaland proper, being there represented by *A. axina*, Westw., and throughout South-East Africa it seems to be confined more or less to the coast belt. While travelling from Salisbury to Beira I observed that after leaving Umtali *caldarena* became gradually scarcer, and after crossing the Revnë River it disappeared altogether. *A. doubledayi* I first met with in the Manini Valley (somewhat west of the Revnë River), and it was plentiful from there right down to the coast.

(5.) *A. pudorina*, Staud. *A. chæribula*, Oberth. I am unacquainted with either of these species; but I notice that Mr. Butler considers *A. acrita*, Dew., to be merely an intermediate form between the two. The latter butterfly I have only met with on a few occasions in Mashunaland throughout the dry season. Had Mr. Butler's theory been correct, I ought to have taken not *acrita*, but *pudorina*. Again, Mr. F. C. Selous, collecting in Manica from January to June, through the height of the rains, took a long series of *acrita*; how is it he never came across the so-called wet season form *chæribula*? These specimens have been referred to by Trimen (P. Z. S., Jan. 16, 1894), and he has pointed out that they

clearly exhibit seasonal variation along the normal lines. This has been quietly ignored by Mr. Butler, who has thereby fallen into the very error against which he warns us later on, viz.: that of confusing local with seasonal variation.

As the dimorphic forms in this genus seem to have been so misunderstood, perhaps a few remarks on other South African species may not be misplaced :—

Acræa asema, Hew. The bright coloured, strongly spotted summer form is replaced in winter by a duller form, in which the black markings are reduced, the two upper spots in subapical row usually being obsolete, and very nearly the whole now is absent.

Acræa aglaonica, Westw. Trimen, in discussing Selous' specimens of this species (P. Z. S., Jan. 16, 1894) refers to some of them as constituting rather a striking variety in the direction of *A. natalica*, Boisd. These are undoubtedly examples of the summer form, which differ from the typical winter form in having, as usual, all the black markings on the upper side very strongly developed. But the most noticeable difference is the disappearance of the peculiar transparent subapical patch, a form of seasonal variation without parallel in South Africa.

Several species, such as *A. petræa*, Boisd., *A. rahira*, Boisd., and *A. doubledayi*, Guer., vary very markedly in the ground-colouring of the ♀ ; but I need only cite the most noticeable example, viz. :—

Acræa halali, n. sp. This species was first taken by Mr. F. C. Selous on the Manini and Vanduzi Rivers, between Umtali and Chimiro, and I have since taken it very abundantly about Salisbury. Trimen considers it to be merely a slight variety of the southern *A. nohara*, Boisd.; but if *A. asema*, Hew., be considered distinct from *A. violarum*, Boisd. (which it is, in my opinion), there is even still more reason for separating *halali* from *nohara*. The description of the insect is as follows :—

♂ *Wet season* form. Bright brick-red, with a strong pink tinge in hindwings, especially towards base. Spots and markings of the same general pattern as in *A. nohara*, Boisd., but very much reduced, so as to give the insect a markedly different appearance; moreover, it differs constantly in the complete absence of the discal spot below first median nervule in forewing, and the third and fifth

spots of discal row in hindwing (I have taken one very strongly marked ♂, in which the latter was present). The sub-basal spot below median nervure in forewings is very much reduced and often obsolete.

The underside is as in *nohara*, but the ground-colour in hindwing is of a rich pink outwardly tinged with ochreous; basal half of cell and a broad, irregular, transverse, discal band whitish, and third, fifth, and ninth spots of discal row wanting.

Dry season form. Larger ground-colour dull ochreous, black markings as in summer form, but spots decidedly larger. Underside much paler and duller. White markings almost obsolete.

♀ *Wet season form.* Ground-colour dull, pale grey, with faint ochreous inter-nervular rays in forewing. Markings as in wet season form of male, except that the black hindmarginal borders in both wings are broader, and suffused on their inner edges. On the underside the forewing is much paler, shining, inter-nervular rays more distinct. Hindwing pale-yellowish creamy, basal half variegated with patches of pink; markings as in ♂.

Dry season form. Larger, ground-colour as in dry season form of ♂, but with basal half of hindwing suffused with pinkish. Spots strongly developed, larger than in preceding form; inner edge of margin in hindwings clearly defined and not suffused. Underside as in dry season forms of ♂.

This species exhibits a greater amount of seasonal variation than any South African *Acræa* I know; but the change in the ♂ cannot be properly appreciated in dried specimens owing to the way in which the brilliant colours of the summer form fade. The specimens described are the extreme forms, and every grade between them can be found. The variation is most curious, as the black spots are much larger in the winter form instead of in the summer one, which shows how impossible it is to lay down any hard and fast rule in such matters. Owing to this development of the spots, the winter form presents a greater general resemblance to *A. nohara*, but the two cannot possibly be confused.

Several of the most striking and curious instances of seasonal dimorphism were passed over in Mr. Barker's paper. I will therefore now shortly refer to them.

When collecting specimens of the handsome genus

Precis, I was not long in noticing that many of the species appeared only in winter, while others were confined exclusively to the summer. A closer investigation of these insects has convinced me that each of the summer species is identical with one of the winter species. My grouping of them is as follows :—

Wet season form.		Dry season form.
(1.) *Precis ceryne*, Boisd.	=	*Precis tukuoa*, Wallg.
(2.) *Precis simia*, Wallg.	=	*Precis cuama*, Hew.
(3.) *Precis octavia*, Cram.	=	*Precis sesamus*, Trim. *Precis amestris*, Drury.

Dry season form.		Wet season form.
(4.) *Precis archesia*, Cram.	=	*Precis pelasgis*, God. *Precis chapunga*, Hew.
(5.) *Precis artaxia*, Hew.	=	*Precis nachtigalii*, Dew.

In *P. natalica*, Feld., *P. tugela*, Trim., and *P. elgiva*, Hew., the seasonal forms are not nearly so marked, and they have, therefore, not been separated. As regards *P. sophia*, Fab., which can hardly be considered as a true South African species, the West Coast variety mentioned by Trimen (S. Af. But., vol. i., p. 221) will doubtless prove to be its dry season form.

The alterations exhibited in this genus are of special interest, not only on account of the great differences in the colouring of their two forms, but also because of their marked change in habits, and a study of them might give us a clearer insight into the true cause of dimorphism.

The general lines on which the variation runs in the genus is as follows :—

The dry season form is smaller, and usually assumes a duller type of colouring on the upper side, sometimes of quite a different hue; the underside becomes of a general brownish tint, more or less resembling a withered leaf, the likeness being heightened by an oblique line running from the apex of forewing to the anal angle of hindwing representing the midrib; also by the marked prolongation of the forewing, so well known in the winter form of *Melanitis leda*. Lastly, the ocelli on the underside are much reduced or obsolescent.

For convenience the species may be divided into two groups: (1) Those in which the seasonal forms do not vary on upperside and very little on underside. (2) Those in which a marked variation occurs. An interesting fact about these groups is that the first, comprising *P. natalica*, *P. tugela*, and *P. elgiva*, is confined to the warmer, low-lying, or heavily-timbered districts (especially along the East Coast), whereas the remaining more variable species occur more abundantly, or even exclusively, in the uplands and in open country. Moreover, in the former, bush-loving group, the underside of the wet season form exhibits almost as great a resemblance to a leaf as does that of the dry season one. The following notes on some of the species may be of interest:—

Precis tugela, Trim. The underside of the summer form changes from its somewhat variegated colouring to an almost uniform dark brown or grey brown; the mid-rib stripe being very clearly defined, and the apex of the forewing still more strongly produced. The only difference on the upper side is the presence, in the winter form, of an ochre-yellow line along costa of forewing. The summer form was first taken by Messrs. J. M. Hutchinson and C. W. Barker, at Karkloof, Natal, in the end of February, 1894; but by the middle of March it had almost been superseded by the winter form. Mr. Hutchinson informs me that there is a marked difference in the habits of the two forms. The smaller summer form is a bolder insect, sailing around and settling on trees at a fair height, almost after the manner of *Charaxes*, whereas the other is much more retiring, keeping among the thick bush and settling low down, or on the ground among dead leaves, etc. This fact will be of interest when we come to discuss the species in which the seasonal forms are not so universally acknowledged.

Precis elgiva, Hew. This species changes but little. The upperside remains unaltered. The winter form is darker and duller than the summer one below, the markings being more indistinct, and the ocelli reduced to mere dots. The apex of forewing is slightly more falcate, as usual.

Precis natalica, Feld. Varies on the same lines as the preceding species, the white markings on the underside of the wet season form becoming much reduced or even obsolete.

We now come to the second group in which the seasonal forms are very distinct, and not generally recognised as such. I will deal with them in the order given in my list above.

(1.) *P. ceryne*, Boisd. = *P. tukuoa*, Wallg. I have never met with these species commonly in life, and am, therefore, unable, to speak from personal experience, but Mr. Hutchinson, of Estcourt, and Mr. Barker, of Malvern, who have both collected for many years in such different parts of Natal, assure me that they are convinced that *tukuoa* is only the dry season form of *ceryne*. Trimen, too, notes the close relationship of the species; indeed, in former years he held them to be the same. They exhibit just the differences one would expect in this genus, the bright tints of *ceryne* being replaced in *tukuoa* by duller colours, the latter also having the ocelli reduced and the forewings strongly falcated.

(2.) *P. simia*, Wallg. = *P. cuama*, Hew. These two so-called species are not common just round Salisbury; but in the upper Mazoe River and middle Umfuli River they are abundant; and I have had excellent opportunities of observing the gradual change from dry to wet season forms, though, unfortunately not *vice versa*. This is a very interesting case of variation owing to the distinct gradations exhibited between the two forms, which may be grouped as follows, according to season:—

(*a*) Midsummer Form.—The typical, small, heavily-marked *P. simia*, Wallg.

(*b*) Early Summer Form.—The larger, more lightly marked form of *simia*, with tendency to white clouding on upperside, described by Trimen as a variety (P. Z. S., 16 Jan., 1894).

(*c*) Late Winter Form.—*P. cuama*, Hew., in which the underside is very much darker and more overclouded than in *simia*, though the markings are precisely similar and well defined, showing a preliminary sign of the midrib line. Apices of forewings falcate.

(*d*) Midwinter Form.—*Cuama*, in which the underside shows most strongly the leaf-like appearance, the *simia* markings being almost obliterated by brown, grey, or yellowish clouding, with midrib line distinct, forewings very strongly falcate.

The type appears to be intermediate between the last two forms, as of course every grade can be found between the two extremes. The dry season form only frequents the bush, settling on the ground among the dead leaves, or very rarely on small plants, the underside colouring affording it excellent protection. As the season advances the habits of the insect change, and in October and November the later form (*c*) may be found in company with the early form of *simia* (*b*), frequenting open tops of kopjes, flying boldly about within a limited area, and settling with expanded wings on shrubs and bushes. This is the habit of all summer forms of *Precis*, and in the end of December in both the Mazoe and Umfuli districts I have seen some numbers of *P. octaira*, *P. simia*, *P. pelasgis*, and *P. nachtigalii*, chasing one another around in open spots on hill-tops, and at the same time there were a few battered specimens of *P. sesamus*, *P. cuama*, *P. archesia*, and *P. artaxia*, all of which were evidently on the verge of disappearing.

(3.) *P. octaira*, Cram. = *P. sesamus*, Trim. (= *P. amestris*, Drury). The dissimilarity in seasonal forms is most marked in this species, but there is much evidence to show their identity. Apart from the fact that they are confined respectively to the wet and dry season, they have been taken in copulâ by Mr. F. N. Streatfield in the Transkri Territory, and on several occasions by Mr. Barker, at Malvern. Moreover, intermediate forms are by no means uncommon, many being recorded by Trimen. On the strength of such seasonal forms alone Mr. Oberthur, in 1883, decided that *P. octaira*, Cram., and *P. amestris*, Drury, were one and the same species. This latter insect is evidently the northern winter form of *octaira*. The larvæ and pupæ of *octaira* and *sesamus* seem to be indistinguishable. In February, 1888, Mr. Hutchinson found a dozen *Precis* larvæ feeding together on one bush, and at the time he considered them to be those of a single species. Early in March they emerged, there being two *octaira* and ten *sesamus*. The latter differs from the normal type of winter *Precis* in the absence of leaf-like colouring below, and the very slight falcation of forewings. This is accounted for by its different habits, for instead of frequenting dead leaves in the bush it prefers the dark rocks on stony and wooded kopjes. The development of the falcation in forewings is

evidently correlated with the leaf-like coloration on the underside in this genus.

(4.) *P. archesia*, Cram. = *P. pelasgis*, God. (= *P. chapunga*, Hew.). The intimate connection between these three forms is much more evident. The conspicuous pale stripe of the summer *Pelasgis* is much darkened and reduced in *archesia* on both surfaces, the underside assuming the usual leaf-like markings, and the apices of forewings being strongly falcate. Trimen's var. A of *archesia* is evidently an intermediate form. I have met with only one example of *chapunga*, which I captured on the 29th December, 1894, in the Maroë Valley in company with *pelasgis*, and I am convinced that it is nothing but an intermediate form of that insect in the direction of *archesia*. In the latter the discal band of the hindwings often shows a tendency to break up into rings round the ocelli, as in typical *chapunga*. Mr. Barker informs me that he has on one occasion taken *archesia* and *pelasgis* in copulâ at Malvern.

(5.) *P. artaxia*, Hew. = *P. nachtigalii*, Dew. These forms are practically identical on the upperside, but the undersides are very different. *Artaxia* with its more falcate forewings and distinctly leaf-like underside, occurs (in Mashunaland at least) only during the drier part of the year, being replaced in December by the smaller *P. nachtigalii*, which is darker and clearer below, with the two ocelli of upperside clearly reproduced in the hindwing. In December, 1895, on two occasions I took a battered ♂ of *artaxia* in copulâ with a newly emerged ♀ of *nachtigalii*. An objection to the amalgamation of these two forms was suggested to me in the fact that Mr. Selous, collecting between Umtali and the coast during the wet season, never took *nachtigalii* but only *artaxia*. I have shown specimens of the former to Mr. Selous, but he asserted that he had never seen the insect. However, while going from Salisbury to Beira, during January, 1896, I kept a careful look out for *nachtigalii*. The most easterly specimens I captured were two ♂s, in very bad condition, on the top of Christmas Pass, near Umtali, on the 14th of January. Beyond that I only observed *artaxia*, taking a fine newly emerged specimen at Chimiro on the 16th January. If my remarks on the *Tugela* group be borne in mind, it will be seen that these facts do not at all invalidate my

contention, but bear out Mr. Butler's remark, that "it does not follow, because a species does not vary in one part of Africa, that it therefore shows equal constancy in another part." In the warmer timbered coast belt *artaxia* varies very little seasonally, but on the plateau the variation is very marked. Mr. A. B. Koe, of Estcourt, informs me that when on a shooting trip in Angoniland (alt. circ. 4,000 ft.), near Lake Nyassa, he took *P. nachtigalii* in considerable numbers in the end of December, 1892, and they were then just emerging.

Another genus presenting most interesting local seasonal variation is *Mycalesis*, the winter forms in the highlands of the interior being markedly different from those of the coast region. In the Mazoe and Umfuli districts of Mashunaland I captured *Mycalesis simonsii*, Butl., and *M. selousi*, Trim., very commonly during the dry season, but they invariably disappeared as the rains set in; in fact, the former is only to be found among the long withered grass with which its colouring harmonizes so well. As I have always considered it to be an axiom that in South Africa there is no such thing as a species (in the true sense of the word) which is confined exclusively to the dry season, I therefore proceeded to investigate the case of *simonsii* and *selousi*, and I am now convinced that they are respectively the dry season forms of *M. perspicua*, Trim., and *M. safitza*, Hew.

Trimen has noted the close connection between *simonsii* and *perspicua*, and, indeed, the underside of the southern winter form of the latter is practically indistinguishable from that of *simonsii*. Moreover, towards the change of seasons *simonsii* shows a strong tendency towards the upperside coloration of *perspicua*, some specimens becoming dark grey in the costal and apical area of forewings, with a paler grey tint partially obscuring the remaining yellow of upperside.

(6.) Such specimens also show a marked development of the ocelli both above and below. I have seen specimens of *perspicua* taken on the Shire River by Mr. Koe, in June, 1892, and they are similar to the Natal form. During the winter of 1893, when travelling from the Limpopo to Salisbury, along the main Mashuna plateau, I never saw a trace of *simonsii*, though when Mr. Koe went up to Matabeleland next winter he observed it first as he

reached the higher veldt as far south as Mangwe where it was common.

The case of *M. safitza*, Hew., is yet more curious. It is a common species on the Natal coast where it exhibits a distinct dry season form described by Hopffer under the name *evenus*. At Kuysua, in the Cape Colony, *evenus* is found both in summer and winter; along the East Coast *safitza* occurs in summer, *evenus* in the winter; on the plateaux in Mashunaland we have *safitza* in summer and *selousi* in winter.

The nomenclature of the South African *Mycalesis* should therefore stand thus:—

Wet season form.		Dry season form.
Mycalesis safitza, Hew.	=	*Mycalesis evenus*, Hopf. *Mycalesis selousi*, Trim.
Mycalesis perspicua, Trim.	=	*Mycalesis simonsii*, Butl.

There are several other species of the *Nymphalidæ* which I believe will eventually be admitted to be merely seasonal forms, but I have not sufficient data to deal with them at present. Neither have I sufficient scope in the limits of the present paper to attempt to offer any explanation of the reason of the greater or less seasonal changes in various species, that being a subject of considerable complexity, to which I hope to return later.

In conclusion, I can only trust that the foregoing remarks may show the field lepidopterists in South Africa, whose numbers, I am glad to say, are increasing annually, the immense importance of labelling every specimen in their collections with locality and date of capture. And further, I hope they may be induced to put on record more than they have done in past years, their experience of the habits, range, etc., of the various species with which they are familiar, for the benefit of systematists at home who are doing such excellent work, but who are often liable to fall into error in differentiating species merely from lack of support on the part of collectors.

Since writing the above I am glad to be able to record an instance of seasonal dimorphism in the genus *Terias* which has been proved by breeding experiments.

While staying with Mr. J. M. Hutchinson, of Estcourt, Natal, in the latter half of last February, I succeeded in obtaining a number of eggs of *Terias zoë*. On my leaving

for England Mr. Hutchinson kindly undertook to rear the larvæ for me and communicate the result. I have just heard from him that two specimens emerged on the 31st of March, and they are undoubtedly *Terias brigitta*, which Mr. Barker has already pointed out as being the probable dry season form of *T. zoë*. Mr. Hutchinson states that the two specimens are lighter on the underside than typical *T. brigitta*, and this is what I should have expected as they are representatives of the early dry season (winter) brood. Their offspring, which would emerge about midwinter, that is in June, will probably show the strongly marked reddish underside of true *brigitta*.

(1.) Since writing this I have had an opportunity of examining the British Museum series upon which Mr. Butler based his theory. There are five specimens labelled as "*Acræa bomba*, Smith (= *induna*, Trim.)," four of these are undoubtedly *A. anacreon*, Trim., and are without any broad apical black patch. The fifth specimen, which has a very heavy black patch and the disc of both wings strongly suffused with blackish, is probably *induna* though differing somewhat from my Mashunaland specimens, and has absolutely no connection with the four examples associated with it. These latter are somewhat lightly marked specimens of *anacreon* and probably represent the *dry* season form in Nyasaland—not the wet, as stated by Mr. Butler. Judging by the figure of Mr. Crose Smith's *bomba* it is not represented in the series at all.

(2.) There are only two specimens of *A. periphanes* in the British Museum, and I certainly doubt their being the wet season form of *guillemei*. The black edging of primaries is certainly slightly better developed in them, but the hind marginal border of secondaries is not nearly so heavily marked as in *guillemei*, and this does not in any way accord with my experience of seasonal changes in this genus.

(3.) The form alluded to here is the *Precis octavia*, var. *natalensis* of Staudinger. I agree with Mr. Butler in considering it to be specifically distinct from the typical *octavia*, Cram., from the West Coast, but I see no necessity for renaming it. This species should therefore stand as *Precis natalensis*, Staud. (= *P. octavia*, Trim. (part) = *Jun. calescens*, Butl.).

(4.) This form (*b*) has been named *Junonia trimenii* by Mr. Butler, therefore both this name and *J. micromera*, Butl. (which is absolutely identical with *P. simia*, Wallg.), will stand as synonyms of *Precis cuama*, Hewitson.

(5.) Since writing I have been able to re-examine this specimen which is in Mr. Trimen's collection. It is clearly an intermediate seasonal form of *pelasgis*; but I cannot agree with Mr. Trimen in attributing it to *P. chapunga*. This latter appears to be a Central African variety of *pelasgis*, and *P. archesia*, var. *staudingeri*, Dew., is probably its dry season form.

(6.) I have seen a specimen from Central Africa, in which the whole upperside colouring is exactly intermediate in tint between *simonsii* and *perspicua*.